

## **WALL-CONCEALED WATER SERVICE BOX**

### **BACKGROUND OF THE INVENTION**

#### **FIELD OF THE INVENTION**

**[0001]** The invention pertains to the field of plumbing systems. More particularly, the invention pertains to a water service box and water conduit system that is concealed within a wall of a building.

#### **DESCRIPTION OF RELATED ART**

**[0002]** In general, when living quarters including houses and apartments are newly built or renovated, cold and hot water pipes coming in from the outdoors are guided to distributors installed below the kitchen sinks, fixed closets, or dressing rooms, and then connections are made from said distributors to various locations in demand including the toilet, bathroom, and multipurpose room.

**[0003]** When examining the cold and hot water pipes that carry from said distributors to each location in demand, a pipe passes inside a pipe protection tube whose outer surface is curved (called the shape of roller shutter), and it passes through the bottom of a room or a living room while being surrounded by a protection tube and arrives at a toilet or a bathroom, and it supplies cold and hot water to the bath tub, washing basin, toilet bowl, etc. when a connection tube is fastened with each water outlet case installed at the entrance of each room.

**[0004]** Such existing mode of burying a water outlet case below the floor does not make it easy to remodel or maintain afterward. For example, if cold and hot water pipes are damaged during use or a water leak exists, it is difficult to examine cold and hot water pipes buried underground with the bare eyes and the floor must be torn and opened up before each pipe is examined. It is also inconvenient to bury them again after checking, remodeling or

renovation. For this reason, instead of the mode of floor burial, the wall burial mode has recently emerged in which direct burial is made in the wall structure near the location in demand such as the toilet and restroom.

**[0005]** Then such a wall-concealed water outlet case employs the form of common pipes made of metal or synthetic resin for its connection pipe that is connected between cold and hot water pipes and a water outlet (faucet). So when the water outlet box is checked inside and maintained, each connection pipe has to be separated one by one and then combined in reverse order so it has been not only inconvenient but also time consuming to work on them.

**[0006]** In addition, the assembled water outlet case has to be disassembled before working on it and then assembled again in a reverse order, which is cumbersome.

## SUMMARY OF THE INVENTION

**[0007]** The present invention provides a wall-concealed water service box comprising a case that has a built-in flexible hose connecting a soft tube with a water outlet and a valve plate, wherein one end of said flexible hose connects and fastens with said soft tube protected by a corrugated tube through a reducing socket; the other end of said flexible hose connects and fastens with said water outlet; a friction projection and a maintenance hole are formed on said valve plate; an rim member is placed around the maintenance hole so that it may be opened and closed with an access plate; and the reducing socket at which the connection tube of said water outlet is inserted and fixed is fastened and fixed with said access plate through a socket insertion hole and a latch formed on a part of said access plate and also fastened with said flexible hose to become one body.

**[0008]** As a result, according to the present invention above, compared with the existing water service box with built-in simple tubing, it can be easily assembled and disassembled, and its internal situation can be checked directly by placing a hand through the

maintenance hole so that it will be easy to determine the situation, to retrofit and maintain, and be effective to finish it neatly with an access plate.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Figure 1 is an exploded oblique view of the wall-concealed water service box of the present invention.

[0010] Figure 2 is a side cross-section view of the wall-concealed water service box of the present invention.

[0011] Figure 3A is an enlarged view of Part A of Figure 2.

[0012] Figure 3B is another example of the flexible hose of the wall-concealed water service box of the present invention.

[0013] Figure 4 is a description diagram showing the fastened condition of the reducing socket of the wall-concealed water service box of the present invention.

[0014] Figure 5 is a description diagram showing the usage condition of the wall-concealed water service box of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

[0015] The present invention deals with a wall-concealed water service box and more specifically with its water service box comprising a case that has a built-in flexible hose connecting a soft tube with a water outlet and a valve plate, wherein one end of said flexible hose connects and fastens with said soft tube protected by a corrugated tube through a reducing socket; the other end of said flexible hose connects and fastens with said water outlet; a friction projection and a maintenance hole are formed on said valve plate; an rim member is placed around the maintenance hole so that it may be opened and closed with an access plate, and the reducing socket at which the connection tube of said water outlet is

inserted and fixed is fastened and fixed with said access plate through a socket insertion hole and a latch is formed on a part of said access plate and also fastened with said flexible hose to become one body.

**[0016]** According to the present invention above, compared with the existing water service box (use) with built-in simple tubing, it can be easily assembled and disassembled, and its internal situation can be checked directly by placing a hand through its maintenance hole so that it will be easy to determine the situation, to retrofit and maintain, and be effective to finish the work neatly with an access plate.

**[0017]** The following describes the configuration of the present invention in further detail by referring to the attached drawings.

**TABLE 1** Description of parts corresponding to reference numbers in the drawings:

1: water service box	2: case	3: corner member
4, 25': elliptic slot	5, 7, 10, 20: nut	6, 22: reducing socket
8: corrugated tube	9, 9': flexible hose	11: connection hole
12: valve plate	13: maintenance hole	14: rim member
15, 16, 17, 25: clamping hole	18, 26, 26': keeper	
19: friction projection	21: access plate	23: socket insertion hole
24: latch	27, 27': finish cap	28: cover
29: connection tube	30: wall	31: mortar
32: tile	33: water tap	34: soft tube
35: packing	36, 36': stainless thread	37: outer skin
38, 38': coil spring	39: small diameter part	40: large diameter part
41: rim member	42: latch groove	

**[0018]** The present invention deals with a wall-concealed water service box, and the water service box (1) is comprised of a case (2) that has a built-in flexible hose (9)

connecting a soft tube (34) with a water tap (33) and a valve plate (12), wherein one end of said flexible hose (9) connects and fastens with said soft tube (34) protected by a corrugated tube (8) through a reducing socket (6); the other end of said flexible hose (9) connects and fastens with said water tap (33); a friction projection (19) and a maintenance hole (13) are formed on said valve plate (12); an rim member (14) is placed around the maintenance hole (13) so that it may be opened and closed with an access plate (21), and the reducing socket (22) at which the connection tube (29) of said water tap (33) is inserted and fixed is fastened and fixed with said access plate (21) through a socket insertion hole (23) and a latch (24) is formed on a part of said access plate (21) and also fastened with said flexible hose (9) to become one body.

**[0019]** Figure 1 is an exploded oblique view of the wall-concealed water service box of the present invention, and Figure 2 is a side cross-section view of the wall-concealed water service box of the present invention.

**[0020]** It may be verified in the figures that the water service box (1) of the present invention is comprised of a case (2) that has a built-in flexible hose (9) and a valve plate (12) that opens and closes.

**[0021]** One end of said flexible hose (9) is connected with a soft tube (34) used for cold and hot water pipes and fastened with the tip of the corrugated tube (8) that protects and surrounds said soft tube (34) through a reducing socket (6) and nuts (5), (7).

**[0022]** On the outer front edge of said case (2), an elliptic slot (4) at the rim member (3) and its inner part are formed so that a valve plate (12) enabling the ability to mount and remove may be combined.

**[0023]** Therefore, while a keeper (18) is inserted through a clamping hole (17) formed at the corner of said valve plate (12) to fix and fasten the valve plate (12) to said case (2), four elliptic slots (4) formed at said corner member (3) are used to align accurate location setting points before complete fastening is performed.

**[0024]** Said valve plate (12) is a means to close or open the case (2) that is made from synthetic resin or metal material, wherein a plurality of friction projections (19) are formed outside so that mortar, tile, etc. may be attached while a maintenance hole (13) of an appropriate size (it must allow a hand to go in) is formed inside.

**[0025]** Said maintenance hole (13) is formed by cutting out a part of the valve plate (12) and then projecting an rim member (14) on its outer part. While its shape may take various forms including ellipse, rectangle, and hexagon, an ellipse is preferred in terms of appearance and practical aspects.

**[0026]** In addition, an access plate (21) is attached to the maintenance hole (13) of said valve plate (12) that can close it and further close it by slightly covering the rim member, as its size is made to be slightly larger than that of said valve plate (12).

**[0027]** On a part of said valve plate (21), a socket insertion hole (23) into which a reducing socket (22) may be inserted and mounted is formed, and on the edge of said socket insertion hole (23), a latch (24) is formed that is a protruding projection so that while said reducing socket (22) is inserted into the access plate (21) and mounted, it can be fastened and fixed firmly with a connection hole (11) of the flexible hose (9) inside the case (2) through nuts (10), (20) (refer to the description of Figure 4 that follows).

**[0028]** Next, after the clamping hole (16) at the bottom of the rim member (14) of the valve plate (12) is aligned to the clamping hole (25) at the bottom of the access plate (21) and then they are fixed by inserting a keeper (26), an elliptic slot (25') on the left and right upper parts of the access plate (21) is aligned near the clamping hole (15) of the rim member (14) of said valve plate (12), and then said elliptic slot (25') is used to set up an accurate location for the access plate (21) before the access plate (21) is attached to the rim member (14) of the valve plate (12) through a clamping hole (26').

**[0029]** Because the elliptic slot formed on the left and right upper parts of said open part (21) is not a simple hole but a long elliptic slot (25'), said access plate (21) is moved

slightly to the left and right and aligned to an accurate location setting point while the clamping holes (16), (25) at the bottom are fixed with a keeper (26), and a keeper (26') is inserted into said elliptic slot (25') to fix it, which results in complete fastening, and then the finishing caps (27), (27') are inserted for finishing to enhance the appearance.

**[0030]** Next, after a connection tube (29) furnished with a cover (28) is inserted into said reducing socket (22) for fastening, a water tap (33) is coupled with it to complete the wall-concealed water service box (1) of the present invention that is furnished with the water tap (33).

**[0031]** As shown in Figure 2, said wall-concealed wall service box (1) of the present invention is installed inside a wall (30) and connects a soft tube (34) coming up from the bottom with the water tap (33) outside through a flexible hose (9) with excellent movement and flexibility instead of the existing standard firm pipes made of a metal or synthetic resin.

**[0032]** Said soft tube (34) is a hot or cold water pipe guided from the outside and connected with a distributor (not illustrated) installed in the retaining wall or mason wall, and said soft tube (34) passes through a floor or a wall and becomes introduced into the water service box (1) while it is surrounded by a corrugated tube (8) outside.

**[0033]** The outlet side of said flexible hose (9) is connected with the water tap (33) through which cold or hot water is ultimately discharged while it is joined with the access plate (21).

**[0034]** As described above, said access plate (21) is fixed and fastened with the rim member (14) of the valve plate (12), wherein, at the time of construction, mortar (31) is applied on the top of said valve plate (12) while said access plate (21) is fastened with the case (2) through the clamping hole (18), tiles (32) are placed over it, and then the access plate (21) is joined to finish the construction.

**[0035]** At this time, a plurality of friction projections (19) of appropriate quantities and sizes have been formed on the top of said valve plate (12) so that the phenomenon of the sliding mortar (31) that is coated on the valve plate (12) or its movement may be prevented, and complete attachment effects are available.

**[0036]** On the other hand, while only mortar (31) may be used outside the said water service box (1) for finishing without using tiles (32), it is preferable to carry out the work while the valve plate (12) and access plate (21) are completely assembled on said case (2).

**[0037]** Figure 3A is an enlarged view of Part A of Figure 2. It may be noted that the outlet of the flexible hose (9) of the present invention is firmly fastened with the reducing socket (22) inserted into the access plate (21) through the connection hole (11).

**[0038]** As may be verified in the drawing, the tip of said connection hole (11) is fastened with a nut (10) while it is inserted into the reducing socket (22), and said reducing socket (22) is fastened with said access plate (21) with a nut (20) at the inner side of the rim member (14).

**[0039]** In addition, at the face where said access plate (21) is in contact with the rim member (14) of the valve plate (12), a packing (35) such as rubber is placed inside so that the binding force of the access plate (21) with respect to the rim member (14) may be maximized.

**[0040]** In Figure 3A above, the flexible hose (9) of the present invention takes a general purpose form and is unique in that the stainless thread (36) is covered on the outer skin (37) with excellent movement and flexibility, and a coil spring (38) is placed inside to prevent snapping.

**[0041]** In addition, Figure 3B is another example of the flexible hose for the wall-concealed water service box of the present invention and is an example, unlike Figure 3A,



that a coil spring (38') is configured on the outer surface of the flexible hose (9') coated with stainless thread (36').

**[0042]** On the other hand, Figure 4 is a description diagram showing the coupled state of the reducing socket (22) in the wall-concealed water service box (1) of the present invention.

**[0043]** Said reducing socket (22) is a binding unit in which one body has a small diameter part (39) and a large diameter part (40), and a latch groove (42) is formed on a part of its top rim member (41).

**[0044]** Therefore, when a latch (24) formed around the socket insertion hole (23) of the access plate (21) is allowed to insert into the latch groove (42) of said reducing socket (22) and is inserted into the socket insertion hole (23) of the access plate (21) up to the large diameter part (40) of the reducer socket (22) and also coupled with the connection hole (11) of the flexible hose (9), a nut (20) is used to clamp to the large diameter part (40) of said reducing socket (22) on the back of said access plate (21), and while the tip of the connection hole (11) of said flexible hose (9) is in contact with the small diameter part (39) of the reducing socket (22), the nut (10) placed on the flexible hose (9) is inserted into the small diameter part (39) of said reducing socket (22) and fastened.

**[0045]** Then, while said reducing socket (22) is inserted into the socket insertion hole (23) of the access plate (21) up to the large diameter part (40), the flexible hose (9) of the reducing socket (22) can be fastened firmly, and as said latch (24) is, in particular, inserted into the latch groove (42) of the reducing socket (22), when the connection pipe (29) that connects a water tap (33) is inserted into and fastened with said reducing socket (22), and said reducing socket (22) does not move or slip, which enables complete binding.

**[0046]** As described above, the wall-concealed water service box (1) of the present invention is comprised of a case (2) with a built-in flexible hose (9) that connects the soft tube (34) and the water tap (33) and a valve plate (12) that opens and closes it, but a

maintenance hole (13) is formed on said valve plate (12) so that the reducing socket (22) that binds the tip of said flexible hose (9) may be opened and closed with a mounted access plate (21). So when a water service box (1) is worked on inside, the access plate (21) attached to the valve plate (12) only needs to be opened to carry out the job without opening the entire valve plate (12), which makes the job convenient.

**[0047]** In addition, if needed, a hand may be inserted inside the maintenance hole (13) formed on said valve plate (12) to carry out the job while checking the situation inside the water service box (1) directly. When a flexible hose (9) is maintained or repaired or the soft tube (34) inside the corrugated tube (8) that has cold and hot water pipes is replaced, the binding area is disassembled at the distributor side, and a hand is inserted into said maintenance hole (13) to pull the flexible hose (9) and take it out easily, which enables to perform repair and maintenance jobs very conveniently.

**[0048]** On the other hand, Figure 5 illustrates the usage condition of the wall-concealed water service box (1) of the present invention, wherein the corrugated tube (8) that protects and surrounds the soft tube (34) of the cold and hot water pipes passes from a distributor and below the floor and inside a wall (30) to connect with the water service box (1) of the present invention, and a water tap (33) such as faucet is connected outside the said water service box (1) to promote convenient use.

**[0049]** As described above, according to the wall-concealed water service box of the present invention, one end of the flexible hose is connected and completed with said soft tube protected by a corrugated tube through a reducing socket; the other end of said flexible hose is connected and coupled with said water outlet; friction projection and a maintenance hole are formed on said valve plate; an rim member is placed around the maintenance hole so that it may be opened and closed with an access plate; and the reducing socket at which the connection tube of said water outlet is inserted and fixed is fastened and fixed with said access plate through a socket insertion hole and a latch is formed on a part of said access plate and also fastened with said flexible hose to become one body. Thus, compared with the

existing water service box with simple built-in tubing, it can be easily assembled and disassembled, and its internal situation can be checked directly by placing a hand through the maintenance hole so that it will be easy to determine the situation, to retrofit and maintain, and be effective to finish it neatly with an access plate. Therefore, its usage and applications in the related fields are expected.

**[0050]** Accordingly, it must further be understood that the embodiments of the invention herein described are merely illustrative of the application of the principles of the invention. Reference herein to details of the illustrated embodiments is not intended to limit the scope of the claims, which themselves recite those features regarded as essential to the invention.